ABSTRACT OF THE DISCLOSURE

A time series of multiple cross-sectional images of a subject are displayed in unique display formats synchronized with the acquisition of the images to provide a precise location for an invasive medical instrument, thus enabling accurate monitoring of the state and motion of the instrument during a procedure. The images are acquired through real time data acquisition apparatus, such as a real time X-ray CT scanner with a multi-line X-ray detector. Each image is displayed in a display area that is deformed to provide depth perception. Multiple display areas are displayed simultaneously on a single image display unit and the display areas can be adjusted to provide easy and continuous comparison of the spatial relationships among the images. Display areas can be overlapped and optionally assigned opacities so that overlapped images can be seen. Display areas can also be assigned opacities and displayed on a three-dimensional image reconstructed with previously acquired data.